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STRUCTURAL SLATE FOR SCHOOL BUILDINGS

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THE STRUCTURAL SLATE COMPANY

PEN ARGYL, PENNSYLVANIA

Representing the majority of the Producers in the
PENNSYLVANIA SLATE DISTRICT

Compiled by the **Structural Service Bureau** *Cooperating with*
the Producers and D. KNICKERBACKER BOYD, Architectural Adviser
and Structural Standardist

This Publication, bearing date of September 15th, 1921, is of the Standard 8½ x 11 size recommended by the American Institute of Architects, and is intended for the Files of Architects, Engineers and Constructors

P R E F A C E

THIS publication on the advantageous uses of slate in Schools and Educational Institutions is offered as one means of securing sound, lasting and economical results at a time when new levels of cost necessitate, more than ever before, fullest consideration of every factor entering into the design, arrangement and construction of buildings.

Slate has been used over a long period of years for many of the purposes herein outlined and its constantly increasing utilization is evidence of the long service which it gives and speaks volumes for its economy; but it remained for the organization comprising the majority of producers in the famous Pennsylvania districts to undertake the work of standardization referred to by the U. S. Geological Survey on Page 5.

The results are now offered in the hope that they may greatly aid Architects and School officials, in addition to which undoubted economies may also be effected through the use of such slate installations and equipment rather than through others requiring special details and manufacture which add to the total cost of the structure without increasing its efficiency.

To determine the sizes, economical arrangements, details of application, desirable accommodations and other factors relating to standardization, and to correlate data concerning blackboards, sanitary installations and various features of School equipment and construction, the Structural Slate Company and the Natural Slate Blackboard Company, in co-operation with the Structural Service Bureau of Philadelphia, have made extensive investigations and have issued the results in a series of publications giving their practical application to slate, as follows:

- Chapter 1.—Origin and Geologic Data.** *Commercial Grading and Standard Finishes.*
- Chapter 2.—Basic Specifications.** *Essential Information and Preparatory Work.*
- Chapter 3.—Stairways.** *Specification, Details and Data concerning Stairways.*
- Chapter 4.—Fittings.** *Illustrating and Describing those used with Structural Slate.*
- Chapter 5.—Toilet Enclosures.** *Standardized Sizes and Parts. Drawings and Specifications.*
- Chapter 6.—Urinal Stalls.** *Standardized Sizes and Parts, Drawings and Specifications.*
- Chapter 7.—Shower Stalls.** *Standardized Sizes and Parts, Drawings and Specifications.*
- Chapter 8.—Laundry Tubs, Sinks and Sink Tops.** *Standardized Sizes and Parts, Drawings and Specifications.*
- Chapter 9.—Caps, Bases, Wainscots and Floors.** *Standardized Sizes and Parts, Drawings and Specifications.*
- Chapter 10.—Architectural Uses of Slate.** *Drawings, Details, and Data.*
- Chapter 11.—Miscellaneous Uses of Slate.** *Drawings, Details and Data.*
- Chapter 12.—Electrical Uses of Slate.** *Drawings and Specifications, Workmanship and Installation.*
- Chapter 13.—Grave Covers and Vaults, Mausoleum Crypts.** *Drawings, Details and Specifications, and also: Natural Slate for Blackboards. Production, Standards, School Regulations, Specifications.*

In addition to the text, extracts from state and local regulations, and other data, each publication contains complete drawings and descriptions, with comparative prices wherever possible. Any or all of these publications may be secured upon request to either of the Companies at Pen Argyl, Penna.

STRUCTURAL SLATE

for

SCHOOL BUILDINGS

PRODUCTION OF SLATE

WHEN the remarkable qualities possessed by slate are considered, and more knowledge concerning its formation, methods of production and application becomes public, a wider appreciation and still more extended use of this material will undoubtedly result. The United States Geological Survey Bulletin No. 586 contains a complete description of the characteristics and quarrying of slate together with a glossary of terms. In this bulletin, T. Nelson Dale says:

"While nearly all of the slates of the United States possess one or two excellent features, few possess many such features and none possess them all. Several are so conspicuous for their well-nigh perfect adaption to certain uses that the demand for them is likely to increase with the growth of the country."

The slate quarries range from just beneath the surface of the ground to a depth of approximately 500 feet, depending upon the thickness of the vein and depth at which the best material is obtainable.

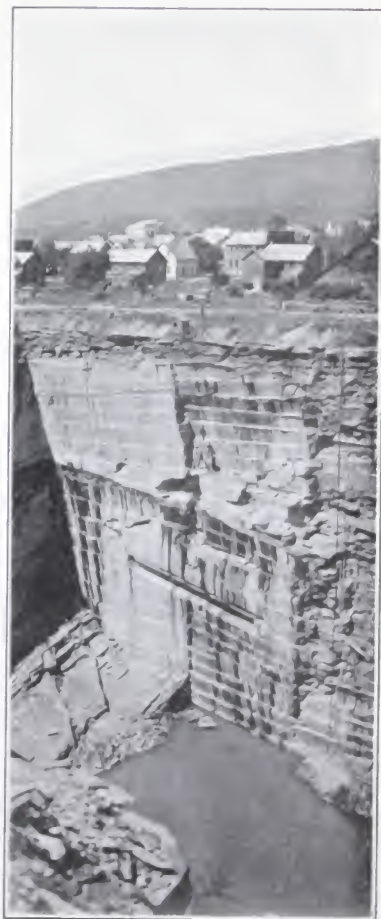
Slate in its natural bed in the quarry is cut out by means of channelling machines and then split into large size slabs, some of which weigh as much as four tons. They are hoisted to the surface and cut by slow-turning steel saws into pieces of workable size.

After being sawed the slate is split with wedges into slabs of almost any desired uniform thickness from $\frac{3}{8}$ " for blackboards to

those for the heaviest structural requirements, after which the slabs are given the desired surface. The ability to so split slate into the thickness required

is due to the cleavage, technically known as "fissility," one of the many characteristics peculiar to this product of nature.

The fine grained texture possessed by the far-famed Pennsylvania slate, from which all "Pyramid" Brand "mill stock" is produced, enables the surface of the material to be finished as desired, varying from the natural split face surface to the smooth, velvet-like surface with which all blackboards are finished.



A Slate Quarry of moderate depth in the Pennsylvania District



Splitting Structural Slate Slabs

SLATE IN THE SCHOOL

CHARACTERISTICS

ATENTION is called to Chapter 1 of the Series on Structural Slate. In this is described the essential characteristics of slate, among them being its toughness and elasticity which is manifested by its resistance to strain, shocks, blows and the effects of settlement. Results of tests which show that slate is one of the least absorptive of any of nature's products are also given in Chapter 1, as are also the results of tests for strength, non-expansion and other requisites. Illustrations in Chapter 1 also show commercial surfaces and the processes of finishing are described.

For structural slate installations, such as enclosures, stairs, stalls, etc., the surface mostly used is the "Standard Sand-Rubbed Finish." This forms a smooth, even surface which, after erection, is usually given a finish consisting of linseed oil and turpentine, to which lampblack is sometimes added.

A still finer surface, when especially desired, may be secured by using the "Honed Finish." This consists of a polishing which can be given as an additional process following the fine sand rubbing. Structural slate is not furnished with this finish unless specifically called for.

While structural slate is produced in but one quality, a selection is made by the Structural Slate Company, as a producing organization representing a large number of quarries, of that slate best suited for each type of installation. There are two gradings, "clear," stock and "ribbon" stock. The latter contains ribbons or veins which run through the slate and which, while in no way affecting its strength or durability for structural purposes, make it unsuitable for certain uses, such as for blackboards, where the finished surface must be as free from markings as it is possible to secure, or for electric installations where the presence of metals in the ribbons makes it undesirable for this purpose. For these installations and elsewhere where ribbons may not be desired, the "clear" stock is used, but, as explained in Chapters 1 and 2, this represents but about 20% of the natural slate rock and is correspondingly difficult to obtain and hence more costly.

The ribbon stock is not only more plentiful than the clear but is consequently much more economical and, being entirely suitable for structural purposes, its use is true conservation of material as well as of money. When oiled the ribbons are practically invisible and the finish shows the same as on clear stock. Therefore, unless particularly specified to the contrary, the slate for sanitary installations, stairs, bases, wainscots, etc., will be furnished of ribbon stock.

USES OF SLATE

While slate for blackboards is the use of this material which may first come into the minds of some, it is the purpose of this publication to acquaint Architects and others with the desirability of this product of nature for still wider use than heretofore in connection with Stairways, Toilet Enclosures, Urinal Stalls, Shower Stalls, Sinks, Sink Tops, Laundry Tubs, Wainscots, Floors and other installations for which slate is especially well adapted.

Architects in all parts of the United States specify nothing else for the blackboards in their school buildings.



Installation of natural slate blackboards in a modern school room at Rosemont, Pa.

Slate does not require replacement and is the least affected of all materials by the constant markings and erasures upon the surface. The velvety smooth, dark surface which makes chalk marks so legible and yet easily erased may be only secured upon natural slate.

Architects and School Officials will now be in position to take fullest advantage of Structural Slate for Enclosures, Shower Stalls, Urinal Stalls, Sinks, Lavatories and other sanitary purposes. For, in addition to its recognized qualities with respect to those requirements, it will no longer be necessary to draw, specify or order slate fixtures as individually prepared units. Concerning slate installations, the U. S. Geological Survey in "Slate for 1920" says:

"The slate quarrymen realize more and more that much of the success of their business, especially in Structural Slate, lies in the standardization of the sizes of the products. The method of procedure usually followed has been to quarry and prepare structural slate in sizes specified by builders and architects. Therefore, the lack of uniformity in design or size prevents the production of material in advance. This condition has led to enforced unemployment in mills and quarries and in serious delays to builders, as the slate quarries cannot always produce stock at the time orders are received. To improve these conditions the Structural Slate Co., of Pen Argyl, Pa., which represents various structural slate producers in the Pennsylvania district, has, through the Structural Service Bureau, proposed standard specifications for structural slate products, and has issued illustrated pamphlets showing sizes and shapes of standard parts for structural work. It is hoped that the acceptance of these specifications by associations of architects and builders will aid materially in stabilizing the slate industry."

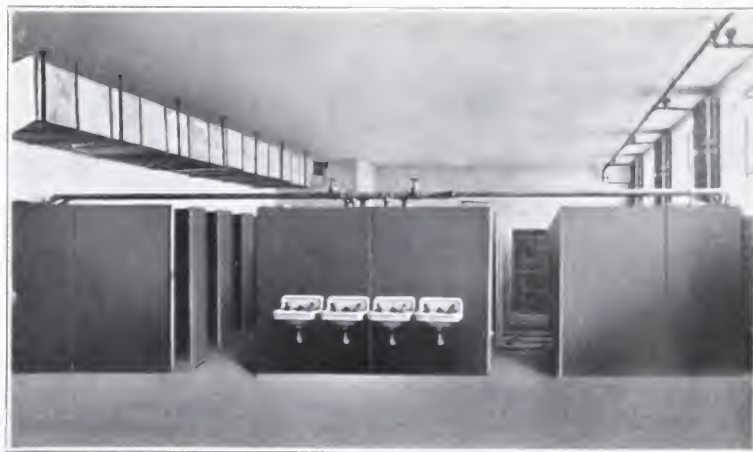
For treads of stairs, with or without risers of slate, the hard vein Pennsylvania slate is being increasingly used for its resistance to wear and because of its noiselessness. Finished with a sand-rubbed finish, the danger of slipping upon the stairs, even though wet, is kept to a minimum.

The corridors, vestibules and halls in schools are subject to very considerable and constant use. As floors in these locations, slate offers a permanent, wear-resistive surface, easily cleaned. For use as a base against the side walls, to prevent the water used in washing the floors from staining the walls, slate again is most practical. Or, if desired, the side walls may be wainscoted with slate. Under the wood trims of doors, slate plinths are effective and as thresholds slate is being used in all types of public buildings. In the Department of the Interior Building in Washington there are 20 miles of slate base, 6,258 slate plinths and 2,477 slate thresholds.

Each of the possible uses of slate in school buildings can be but suggested in this publication. Complete data, drawings and specifications are contained within each of the Chapters. While it is hoped that such information gives to the designer sufficient material to enable him to properly specify slate, if more detailed information is needed the Structural Slate Company places itself at the disposal of all those interested and will be glad to furnish any additional data, drawings or Chapters, as required.

SPECIFICATIONS

The proper specifying of structural slate is one of the contributory causes to its successful use in any building. In connection with the essential information as to the structure, characteristics, processes of manufacture and assembling of slate, as mentioned in this publication and set out at greater length in the individual Chapters, the Structural Slate Company and the Structural Service Bureau have prepared a specification which is published in Chapter 2. It contains not only General Conditions describing the materials, workmanship, installation and finish, but also offers suggestions for the preparatory work, by other contractors, necessary to receive the slate.



Installation of Slate Shower Stalls in Bethlehem High School, Bethlehem, Pa.

For the convenience of those who desire to make use of these specifications without writing them out at length, a short form of General Conditions is given in Chapter 2 which, if used as therein suggested, will result in compliance with the longer form. This short form is reproduced herewith:—

GENERAL CONDITIONS.—*The General Conditions, paragraphs 1 to 14 inclusive, as printed in Chapter No. 2 on Structural Slate, copyrighted by and registered with the Structural Service Bureau of Philadelphia, bearing date of April 15, 1920, are hereby made to constitute the General Conditions of this specification.*

After this the location, number and arrangement of installations should be mentioned. If standardized types are to be used they may be called for by type and number as described in the individual Chapters.



A portion of the 96 slate Shower Stalls in the Michigan State Normal College

STAIRWAYS

STAIR halls and stairways in school buildings must be convenient to exits and of a size and construction to properly safeguard the lives of the children within the building as well as to provide ample accommodation for interchange of classes and for other school purposes.

The location and design are primarily peculiar to the individual building—the problem of construction, however, is somewhat similar in the same types of structures. The stairs must be rigid and strong. They should be of non-combustible construction wherever possible in order to minimize the danger of spreading fire and smoke.

It is in connection with the materials and methods of construction that the data presented in Chapter 3 of the Series on Structural Slate will prove of value. Four suggested methods of construction are detailed, of which two are reproduced on this and the next page. These drawings show two types of stairs—one of steel construction with slate treads—the other of reinforced concrete with slate treads and slate risers. In both cases the strings are also of slate. The two types not here reproduced show steel construction with slate risers and treads and reinforced concrete construction with slate treads and cement risers.

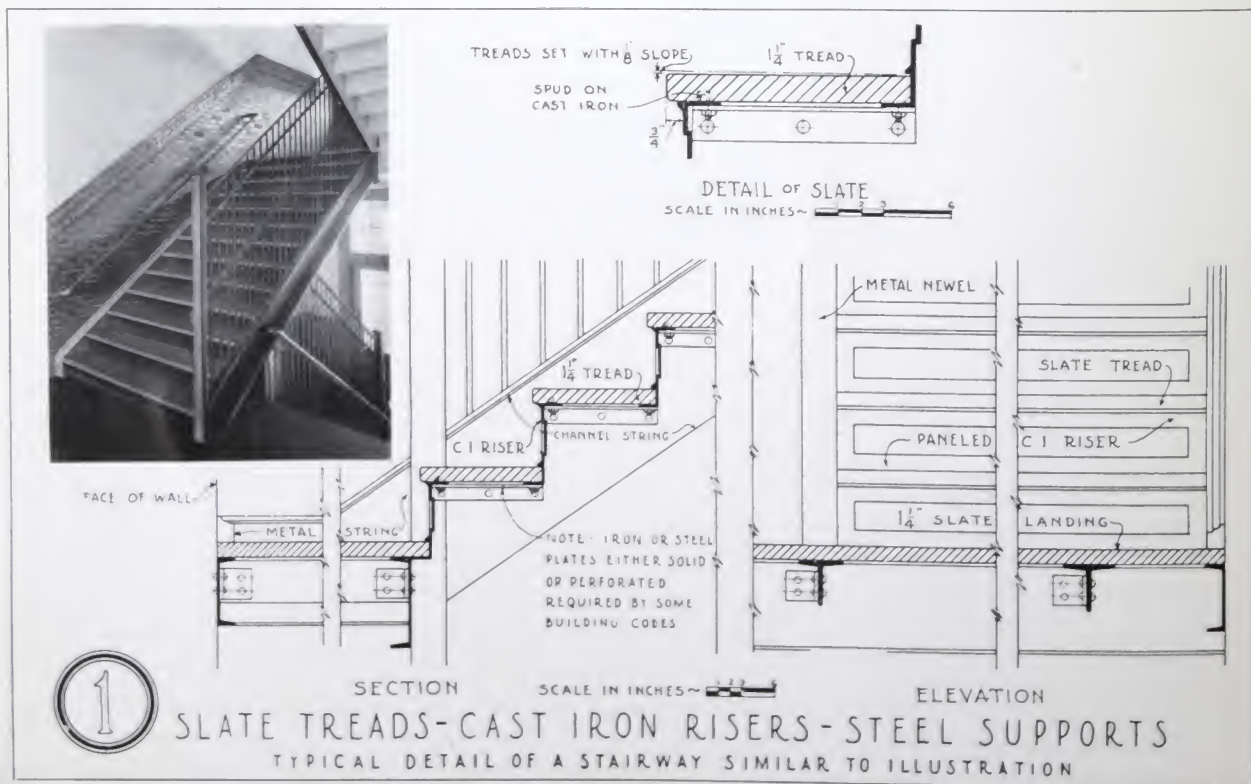
Both for risers and treads the use of hard-veined, ribbon stock Pennsylvania Slate has proven itself as fulfilling all requirements of strength and resistance to wear. The non-absorptive qualities of slate are such that frequent washing of the stairs will not in any way injure the material.

DATA CONCERNING STAIRS

Certain data concerning the proportion of treads and risers in stairs in school buildings is herein presented. Additional data upon this subject will be found in Chapter 3.

STRENGTH OF STAIRS

Where Building Code Regulations do not specifically state the load to be provided for in calculating stairs, it is advisable to use 150 lbs. per sq. ft., as it has been developed that a densely packed crowd in a flat space weighs approximately that amount. While such a load could probably never be placed upon the stairs, there is a certain amount of vibration due to the movement of the load which makes this figure none too great for safety.



RISE AND TREAD

The arrangement of a stairway for ease in walking up and down depends upon the proportion of rise to the tread. Of the several rules applicable to proportioning stairs the best one is as follows:

The sum of twice the rise, plus the tread should total from 24" to 26"—thus a stairs with a rise of $7\frac{1}{2}$ " and a tread of 10" would total 25" according to this rule.

The relation of tread to riser is a question of judgment; outside steps to a public building or to an interior monumental stairway should have wider tread and less rise than ordinarily would be the case.

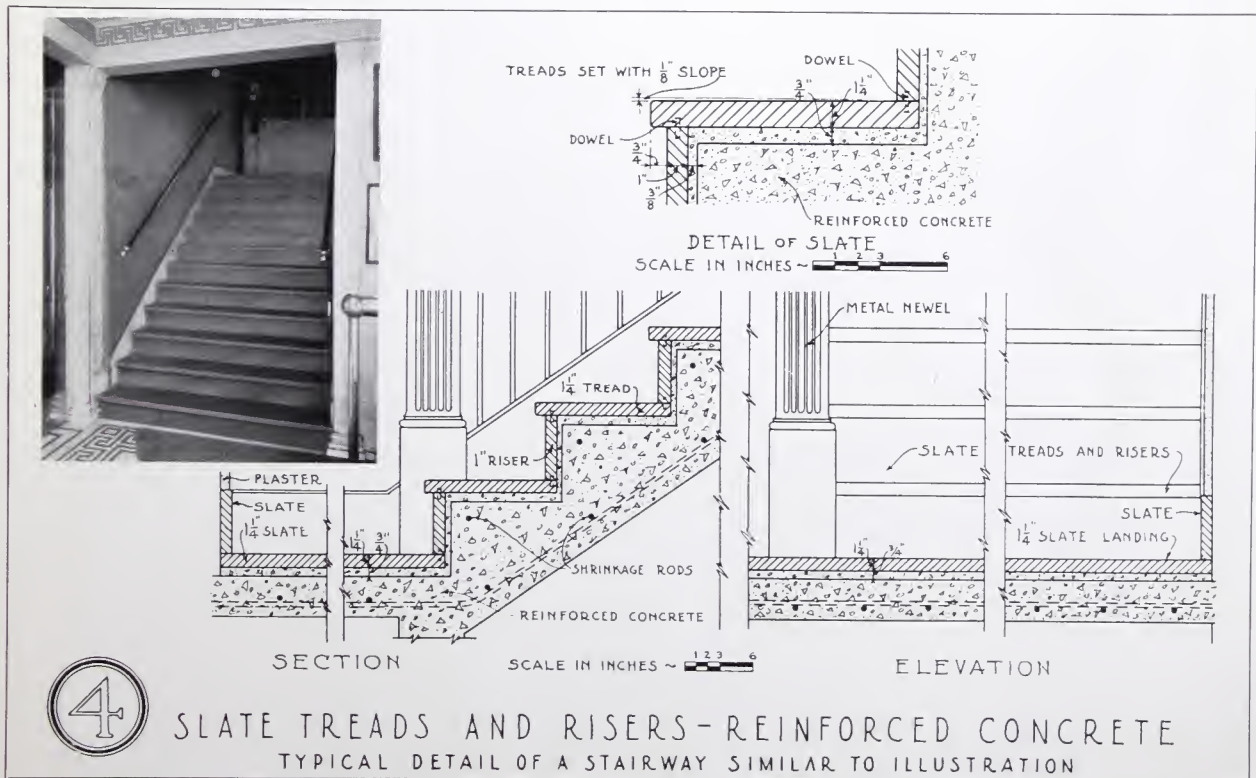
In "Stairs and Stairways" one of the "safe practices" issued by the National Council, there appears the following table of standard dimensions of treads and risers:

ANGLE OF STAIRWAY WITH HORIZONTAL	28°27'	29°25'	30°25'	31°26'	32°28'	33°32'	34°37'	35°44'	36°52'	38°02'	39°12'	40°25'	41°38'	42°53'	44°09'	45°26'	46°44'	48°04'	49°24'	50°00'
RISER - INCHES	$6\frac{1}{2}$	$6\frac{5}{8}$	$6\frac{3}{4}$	$6\frac{7}{8}$	7	$7\frac{1}{8}$	$7\frac{1}{4}$	$7\frac{3}{8}$	$7\frac{1}{2}$	$7\frac{5}{8}$	$7\frac{3}{4}$	$7\frac{7}{8}$	8	$8\frac{1}{8}$	$8\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{1}{2}$	$8\frac{5}{8}$	$8\frac{3}{4}$	$8\frac{13}{16}$
TREAD - INCHES	12	$11\frac{3}{4}$	$11\frac{1}{2}$	$11\frac{1}{4}$	11	$10\frac{3}{4}$	$10\frac{1}{2}$	$10\frac{1}{4}$	10	$9\frac{3}{4}$	$9\frac{1}{2}$	$9\frac{1}{4}$	9	$8\frac{3}{4}$	$8\frac{1}{2}$	$8\frac{1}{4}$	8	$7\frac{3}{4}$	$7\frac{1}{2}$	$7\frac{3}{8}$

CAPACITIES AND WIDTHS

"Specifications for Construction of a Standard Building" is the title of a publication issued by the Committee on Building Construction of the National Fire Protection Association, which contains data relating to these subjects.

Note.—Chapter 3 contains also a table of risers carefully worked out for the convenience of Architects and for the drafting room showing the heights of risers for varying distances from floor to floor. There is also a list of the actual measurements of stairs which have been erected in existing buildings and which should be of value in determining the rise and tread suitable to almost any type of structure or any location.



TOILET ENCLOSURES

IN a study of the situation pertaining to the size, arrangement and design of toilet enclosures so as to be of the greatest assistance to architects and constructionists as well as to themselves in the production of slate for this purpose, the adoption and promulgation of certain standardized sizes and types by The Structural Slate Company has resulted. This has made it possible to so produce the slate partitions, backs, stiles, etc., that the designer has yet almost unlimited choice in the layout of the enclosures within a building.

Three types of enclosures have been adopted as standard. Type A is an all-slate type, consisting of slate backs, partitions, stiles and ends with slate rails across top. Type B consists of slate backs, end stiles and ends to the floor and with intermediate partitions and stiles supported 11" above floor on N. P. Brass Standards. Across the top are N. P. Brass rails on top standards of the same material. Type C Enclosures consist of slate backs and ends to floor and no stiles with partitions 11" above floor on bottom standards. Top standards and rails are similar to Type B.

Types B and C are also furnished in alternate type with the ends 11" above floor the same as intermediate partitions.

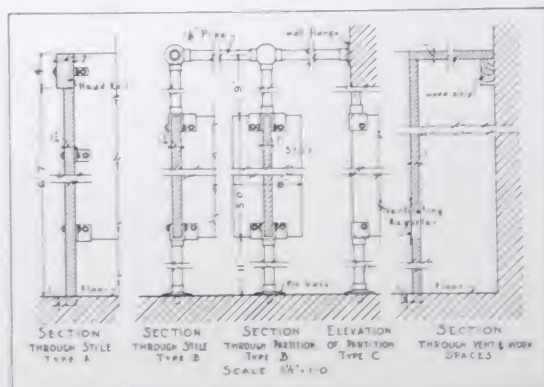
Each of these types is furnished in single units and also back to back. They are also furnished with either vent spaces or work spaces back of the enclosures, when so designated.

There are two widths of enclosures and three lengths, available in the different types as shown by the accompanying table. Each of these types, including alternates, with full description of all that is furnished with each type when specified in accordance with Chapter 5, is exemplified by the reproduction of the two pages showing Type BV, upon Page 9. This shows an enclosure of Type B with vent space back of same.

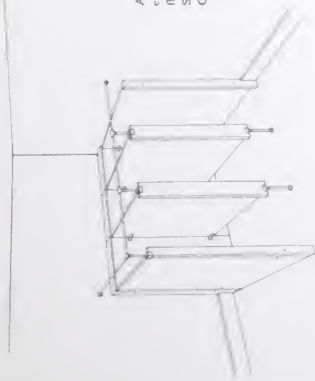
Size	Width	Length	Type
1	2'-10"	4'-6"	AB
2	2'-10"	4'-0"	ABC
3	2'-8"	4'-6"	AB
4	2'-8"	4'-0"	ABC
5	2'-10"	3'-6"	C
6	2'-8"	3'-6"	C

The thickness, jointing and construction of the "Pyramid" Type Enclosures are fully detailed, similar to the drawing illustrated on this page. These details, in connection with the perspectives, plans and descriptions indicate exactly what will be furnished by the Structural Slate Company to the contractor and how, without the necessity of specialized individual detail drawings, the standardized types should be erected.

Page 11, Urinal Stalls, contains also data of value in determining the number of W. C. Enclosures within a school building.



TOILET ENCLOSURES - PYRAMID TYPE BV



ALTERNATE Type - Exposed ends and stiles are set 11" above floor, supported on N. P. Brass Standards similar to partitions. Opposite page shows elevation.

DESCRIPTION OF PYRAMID TYPE BV ENCLOSURES

Slate backs and ends are continuous to floor. Slate partitions are set 11" above floor. End stiles are continuous to floor, other stiles are set 11" above floor, supported on N. P. brass standards. Backs, ends and partitions are 1" thick. Stiles are 1 1/2" thick. Finished height from floor to top of backs, ends, stiles and partitions is 5' 11". Backs, ends and stiles are let 1" into floor. Top standards are 9" high to center of 1 1/2" outside diameter tubing across front and at exposed ends, and all are of N. P. brass. Rails are finished against walls with N. P. cast brass flanges. Ventilating space is 7" wide, covered with 1" slate and closed at free standing ends with 1" slate.

Unless otherwise specified enclosures will be furnished in Ribbon Stock with all exposed surfaces Standard Sand Rubbed.

All required angles, stirrups, bolts, nuts, bottom standards, top standards, top rails and wall flanges are included and will be furnished of brass, nickel plated. Ventilating register faces, 4' x 10", with black japanned finish, are included.

Enclosures will be furnished either with right or left end or with both ends free standing, or with both ends against walls, in accordance with drawings or instructions.

Alternate type will be furnished only when specified as Type BV Alternate.

Type BV Enclosures and Alternates as illustrated and priced, with weights given in pounds, include all site and fittings for a complete installation as described, but do not include doors, door hardware, vent flue collars or accessories.

NOTE: Any doors and hardware required for doors, any fittings or accessories for enclosures other than the angles, stirrups, bolts, nuts, standards, tubing and register faces required for construction may be selected from Chapter 4 on Fittings or from other sources and should be specified accordingly.

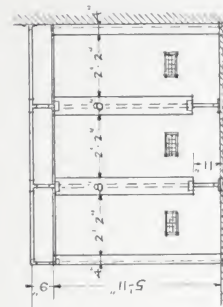
RIBBON STOCK - STANDARD SAND RUBBED FINISH

	TYPE 1		TYPE 2		TYPE 3		TYPE 4	
	PRICE	WEIGHT	PRICE	WEIGHT	PRICE	WEIGHT	PRICE	WEIGHT
1 STALL UNIT COMPLETE AS DESCRIBED	105.75	1385	99.50	1290	103.25	1370	91.00	1275
ALTERNATE TYPE AS DESCRIBED	99.50	1225	93.50	1140	100.50	1210	91.25	1130
FOR EACH ADDITIONAL UNIT ADD	53.75	735	49.50	665	51.50	705	47.00	645

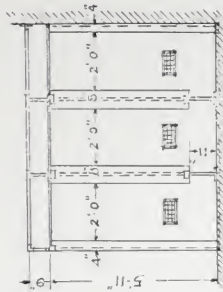
OVERALL DIMENSIONS

NO. OF STALLS	1	2	3	4	5	6	7	8	9	10
2'-10" WIDTH	2'-10"	5'-8"	8'-6"	11'-4"	14'-2"	17'-0"	19'-10"	22'-8"	25'-6"	28'-4"
2'-6" WIDTH	2'-6"	5'-4"	8'-0"	10'-8"	13'-4"	16'-0"	18'-8"	21'-6"	24'-0"	26'-8"

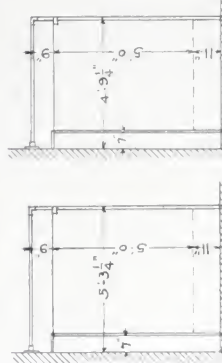
PLANS AND ELEVATIONS OF ENCLOSURES TYPE BV



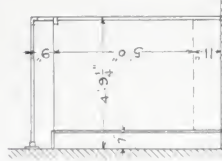
FRONT ELEVATION, TYPES BV1-2.



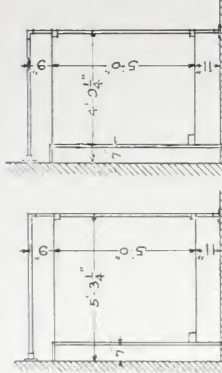
FRONT ELEVATION, TYPES BV3-4.



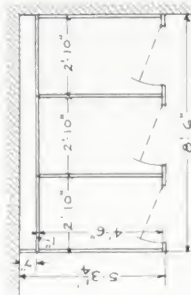
END ELEVATION TYPES BV1-3.



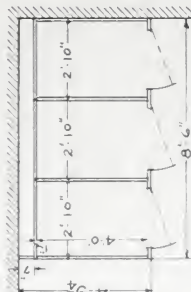
END ELEVATION TYPES BV2-4.



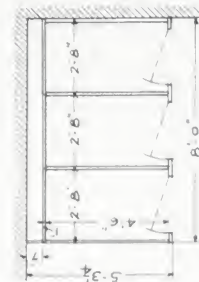
ALTERNATE ENDS TYPES BV1-3.



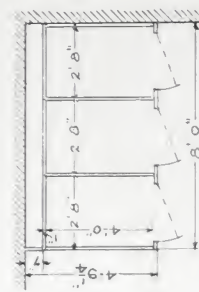
PLAN TYPE BV1.



PLAN TYPE BV2.



PLAN TYPE BV3.



PLAN TYPE BV4.

SHOWER STALLS

An essential to the correct installation of shower stalls is the use of a material which, in itself, will not absorb water and the construction and installation of which will be such as to prevent leakage and not to require constant upkeep or replacement.

The details in Chapter 7 have been carefully worked out for the partitions, backs, floors and all other structural parts of slate showers. As evidence of the satisfactory use of this material in School Buildings, two large installations of shower stalls with dressing rooms, all of slate, are shown on page 5 of this publication. They are parts of the equipments in the new High School building at Bethlehem, Pa., and in the Girls' Gymnasium in the Michigan State Normal College.

Comprehensive data and illustrations of various types and sizes of slate showers which have been adopted by the Structural Slate Company as standards and are recommended for consideration preparatory to laying out buildings are contained in Chapter 7, entitled "Shower Stalls." It will be found that three sizes of stall are suggested together with five types all of which are available in the sizes and arrangements shown by the accompanying table:

Size No.	Width	Depth	Type
1	3' 0"	3' 0"	A
2	3' 0"	3' 6"	ABCDE
3	3' 6"	3' 6"	BCDE

Type A consists of slate slabs forming the backs, ends and partitions with slate floors flush with floor of room for use where requirements as to splashing of water on floors are not exacting.

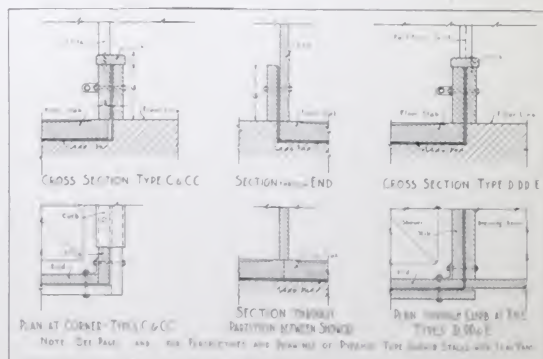
Type B is similar to Type A except that a curb is placed on the front of the shower at the bottom in order to prevent water running out over the floor.

Type C is a further development of Type B having slate stiles at either side of the front.

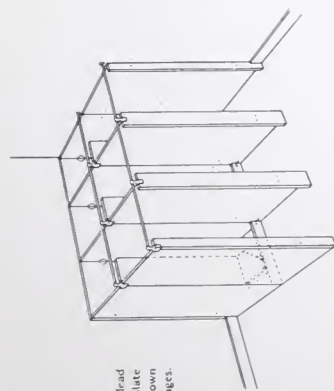
Types D and E are combination dressing room and shower types. The former has a separate dressing room for each shower and the latter a shower between each two dressing rooms. As an indication of how completely each type is detailed, the drawings and descriptions of Type D are reproduced upon the opposite page.

All types have N. P. brass fittings to securely fasten the slate together and have N. P. brass bars at the top secured by N. P. brass top standards.

All types of showers are so arranged that they can be used with or without metal pans, according to location in the building. If lead or other metal work is desired or necessary, the additional pieces of slate to accommodate the pans can be called for without change in arrangement. Details such as those illustrated on this page are shown in Chapter 7, indicating how the metal pans and slate work may be installed in connection with any type of shower adopted.



SHOWER STALLS - PYRAMID TYPE D



LEAD Pan. The position of the lead pan and the extra pieces of slate required for this shower are shown by drawings on separate pages.

DESCRIPTION OF PYRAMID TYPE D SHOWER STALLS

Slate backs, ends, partitions and front stiles of Dressing Rooms are continuous to top of floor slab. Stile between Shower and Dressing Room is continuous to top of curb. Curb at bottom is 6" high. Backs, ends, partitions, stiles and curb are 1" thick. Floor slab is 2" thick, sloping to drain outlet in center of slab. Slate seat in Dressing Room is 1" thick. Finished height from top of floor slab to top of backs, ends, partitions and stiles is 6'-6". Top standards are 2 1/8" high to center of 1 1/8" outside diameter tubing across fronts and between Shower and Dressing Room. Rail finished against wall with wall flange. Unless otherwise specified, Shower Stalls will be furnished in Ribbon Stock with all exposed surfaces Standard Sand Rubbed, including both sides of both ends, regardless of location.

All required angles, bolts, nuts, bottom standards, top standards, top rails, wall flanges, seat angles and double drainage drain for outlet are included and will be furnished of brass, nickel plated.

Where it is desired to use lead pans with Type D Showers, there will be no change in size or arrangement, except in placing of curb at bottom between shower and Dressing Room. Additional pieces to cover lead work will be furnished if shower is specified as Type D for lead pan.

Type D Shower Stalls either without or for lead pans, as illustrated and priced, with weights given in pounds, include all slate drilling of holes, drain and fittings for a complete installation as described, but do not include traps, valves, shower heads, piping, lead pans, shower curtains, snap hooks, doors, hardware or accessories.

NOTE:—Any doors and hardware required for doors, any fittings, trimmings or accessories for Shower Stalls other than the angles, bolts, nuts, standards, rails, wall flanges and drain required for construction may be selected from Chapter 4 on Fittings or from other sources and should be specified accordingly.

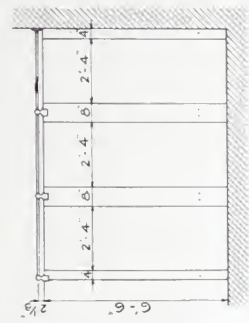
RIBBON STOCK - STANDARD SAND RUBBED FINISH

1 STALL UNIT COMPLETE AS DESCRIBED	WITHOUT LEAD PAN			WITH LEAD PAN		
	SIZE 2	SIZE 1	SIZE 3	SIZE 2	SIZE 1	SIZE 3
PRICE	156.75	223.00	161.75	223.00	161.75	230.00
WEIGHT	110.75	147.5	122.50	156.5	111.75	147.5
FOR EACH ADDITIONAL UNIT, ADD						
	110.75	147.5	122.50	156.5	111.75	147.5

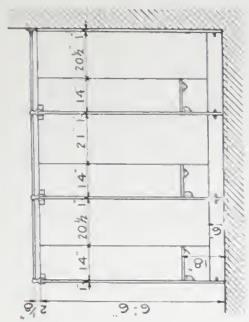
OVER-ALL DIMENSIONS

NO. OF STALLS	1	2	3	4	5	6	7	8	9	10
3'-0" WIDTH	3'-0"	6'-0"	9'-0"	12'-0"	15'-0"	18'-0"	21'-0"	24'-0"	27'-0"	30'-0"
3'-6" WIDTH	3'-6"	7'-0"	10'-6"	14'-0"	17'-6"	21'-0"	24'-6"	28'-0"	31'-6"	35'-0"

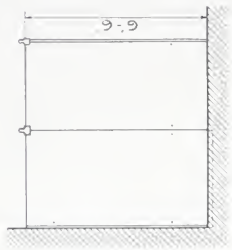
DRAWINGS OF SHOWER STALLS - TYPE D



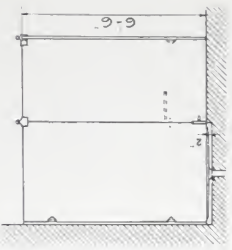
FRONT ELEVATION - TYPE D-2



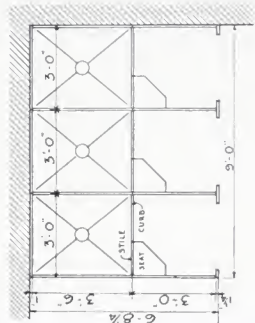
LONGITUDINAL SECTION - TYPE D-2



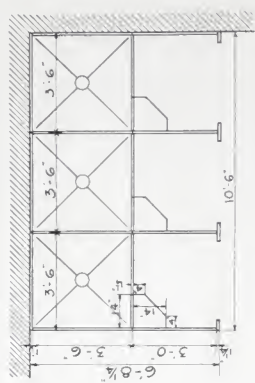
END ELEVATION



SECTION



PLAN - TYPE D-2



PLAN - TYPE D-3

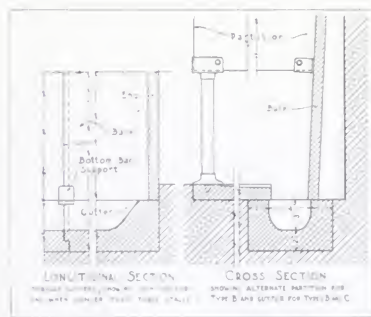
URINAL STALLS

THE exacting requirements for urinal stalls are fully met by the use of Structural Slate. The characteristics of slate both as to rigidity of construction and non-absorption of liquids are such that it can be easily produced to suit any special size or type of urinal in addition to the standardized types and sizes which are promulgated by the Structural Slate Company. These were adopted as a result of a study of sizes and arrangements of fixtures already installed in School Buildings and in other types of structures.

Here again if the suggested types and sizes, as shown in Chapter 6, are used there will be a resultant economy in installation and future upkeep. The sizes and types are such that they fulfill almost any requirement in School Buildings.

Of the four types, A has slate backs, ends and partitions continuous to top of floor slabs, the inner portion of the partitions being cut out to a height of 18". This type is suitable for use with separate urinal bowl, there being no gutter drain in the floor.

Type B has slate backs, ends and partitions and slate gutter; the backs are sloping so that they may be thoroughly covered with water from the flush pipes or fan spreaders, either of which may be used. Drawings and descriptions illustrating Type BV are reproduced upon the opposite page. The sloping back is standard with all types.



Type C is similar to Type B, except that there are no partitions forming separate stalls. It may be of any length without divisions.

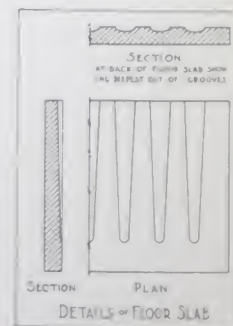
Type D is an all slate type, with overhead flush trough of slate and slate ends, back, partitions, gutter and floor. This is made up only with a vent space in the rear, while Types A, B and C can be obtained either with or without the vent space.

The height adopted for all urinals is 4' 6" from floor to top, as it was found that this was the average of the many installations examined. A width of 23" in the clear for the single stalls was adopted although narrower or wider stalls may be used in connection with any of the types shown by calling for the difference on the drawings or in the specifications.

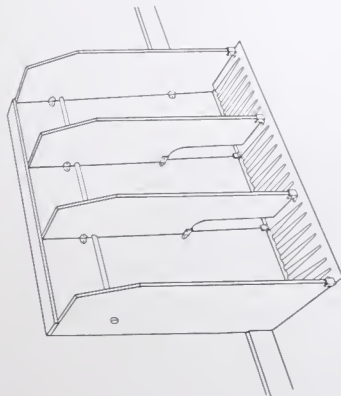
For the information of those specifying "Pyramid" type slate urinals, details are shown in Chapter 6 similar to the ones on this page, illustrating the sizes and arrangements of slabs and the method of jointing.

Within this same Chapter is also data suggesting the urinal accommodations to be provided in various types of buildings where they are not controlled by local, state or other regulations. As an instance, the city of Indianapolis in its "Standardized Requirements for the Construction of Elementary School Buildings," provides:

"The main toilet rooms shall be well lighted and ventilated and of ample size to accommodate without crowding the installation of plumbing fixtures as prescribed by the State Board of Health, viz: One water closet for each fifteen girls or fractional part thereof; one water closet for each twenty-five boys or fractional part thereof; and one urinal for each fifteen boys or fractional part thereof. In estimating the number of water closets required, the maximum number of pupils which the building is to accommodate shall be divided 40 per cent boys and 60 per cent girls."



URINAL STALLS ~ PYRAMID TYPE BV



ALTERNATE Type. Partitions are set 12" above floor slab, supported on N. P. brass standards. Ends project 3" further from back than in regular type. The opposite page shows elevation.

DESCRIPTION OF PYRAMID TYPE BV URINAL STALLS

Slate backs, ends and partitions are continuous to top of floor slab and gutter, the inner portion of the partitions being cut out to height of 18". Backs slope 1/2" to each 1' 0" in height and rest on bottom back supports over slate gutter. Slate floor slab is 1 1/2" thick, grooved and drained to gutter. Finished height from top of floor slab to top of backs, ends and partitions is 4' 6". Vent space is 5" wide at top and 7" wide at bottom with 1" slate cover. Splash slab at bottom of vent space is 1" slate.

Slate gutter is 10" x 5" cut from solid piece and drained to outlet. Outlet in one, two or three-stall installations will, according to standards, be placed at one end of the gutter and will be reversible for either right or left side. Outlet placed in center only when so specified except in four-stall and six-stall units.

Unless otherwise specified urinal stalls will be furnished in Ribbon Stock with all exposed surfaces Standard Sand Rubbed, including both sides of both ends, regardless of location.

All required angles, stirrups, bolts, nuts, bottom standards, bottom back supports, reversible perforated flushing pipe, clamps, cap, loose key stopcock and strainer for gutter outlet are included and will be furnished of brass, nickel plated. Supports in Vent Space are included and will be furnished of iron or steel, galvanized.

Alternate type will be furnished only when specified as Type BV Alternate.

Type BV Urinal Stalls and Alternates as illustrated and priced, with weights given in pounds, include all slate, drilling of holes and fittings for a complete installation as described, but do not include cutting any holes in end slabs or top cover for ventilation or furnishing any vent flue collars.

NOTE: Any fittings, trimmings, accessories or cover slab fasteners for urinal stalls other than the angles, stirrups, bolts, nuts, standards, bottom back supports, flush pipe, clamps, cap, stopcock, strainer and vent space supports required for construction may be selected from Chapter 4 on Fittings or from other sources, and should be specified accordingly.

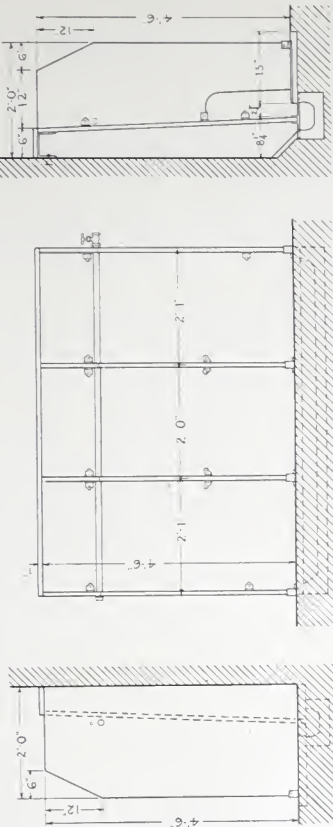
RIBBON STOCK ~ STANDARD SAND RUBBED FINISH

	TYPE BV PRICE	BV ALTERNATE PRICE	WEIGHT LBS.
1 STALL UNIT COMPLETE AS DESCRIBED	\$56.75	\$59.50	57.75 63.00
FOR EACH ADDITIONAL UNIT, ADD	43.00	39.50	44.00 33.00

OVER = ALL DIMENSIONS

NO. OF STALLS	1	2	3	4	5	6	7	8	9	10
	2'-2"	4'-2"	6'-2"	8'-2"	10'-2"	12'-2"	14'-2"	16'-2"	18'-2"	20'-2"

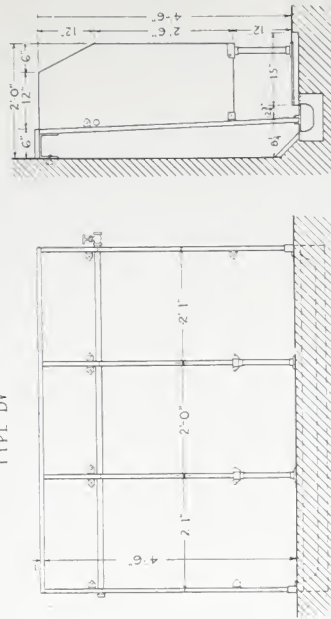
DRAWINGS OF URINAL STALLS ~ TYPE BV



FRONT ELEVATION
TYPE BV

END ELEVATION

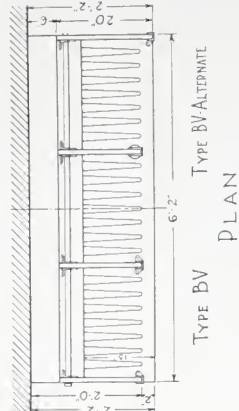
SECTION



FRONT ELEVATION
TYPE BV-ALTERNATE

END ELEVATION

SECTION



TYPE BV PLAN

TYPE BV-ALTERNATE

PLAN

SINKS, TUBS AND LAVATORY TOPS

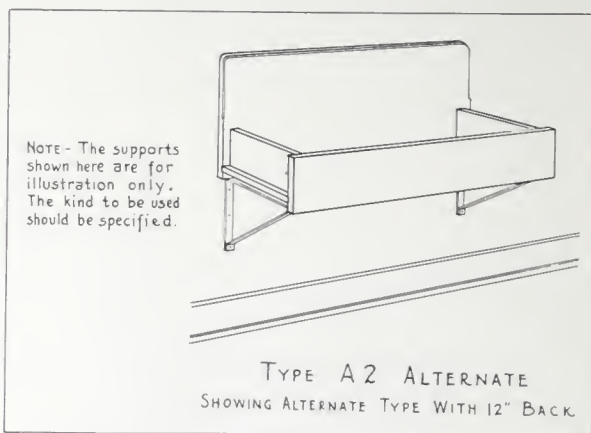
THERE should be provided in school buildings more than the average number of basins or sinks because of their intensive use by the children during certain periods of the day. Being so resistive to constant use as well as economical in installation, slate is peculiarly well adapted for this purpose. In addition the sinks and sink tops in laboratories and manual training rooms could also well be of slate, non-staining and odorless, an ideal material for these locations.

Various types and sizes of sinks—with or without drain boards, may be secured from the Structural Slate Company. There have been adopted certain standardized sizes which are kept constantly in stock for prompt shipment. All of this data is more fully set forth in Chapter 8. One of the types of slate sinks with backs for use in school rooms where research work is conducted in physics, geology, chemistry, etc., or in manual training rooms is the Type A-2 Alternate, illustrated on this page. This type sink is available in eleven different sizes, either with or without the backs.

In this same Chapter 8 there are shown several types of Laundry Tubs, with standardized sizes and details. Any of these would make suitable adjuncts to modern domestic science rooms.

The wash rooms, in which there occurs at certain periods of the day a sudden and considerable use of the basins, require a material for the tops of the basins which is resistive to the constant wear and tear and which does not accumulate dirt or stains and is easily cleaned. Such a top of slate, similar to the illustration of the installation shown on this page, can be secured for any size or number of basins.

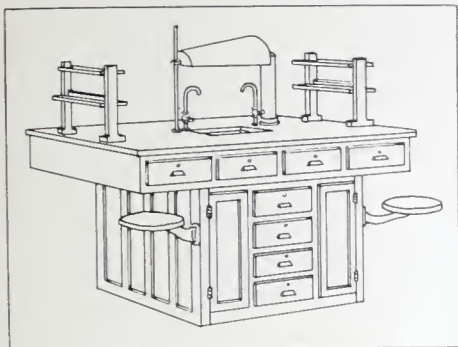
The number of basins required in proportion to the number of pupils in the school must necessarily be left to the judgment of the designer unless state or local regulations govern. There is no fixed rule to apply to this, as the number of class rooms with the number of pupils in each room and the arrangements provided for sanitary conveniences will all aid in determining the requirements.



FURNITURE AND EQUIPMENT

IN the equipment of laboratories within School Buildings one of the determining features as to the material of which the furniture is to be constructed or protected is that it should provide the most effective resistance to the very considerable "wear and tear" usual during the school term when there is constant use by many different persons.

It has been found that Slate—with its qualities of resistance to wear as well as to stains and moisture is particularly well adapted for use as table tops in science rooms or physical laboratories. Particularly is this true when it is necessary to have a sink in the table such as illustrated by the type of desk shown on this page. In this case the table top and sink both are constructed of slate.



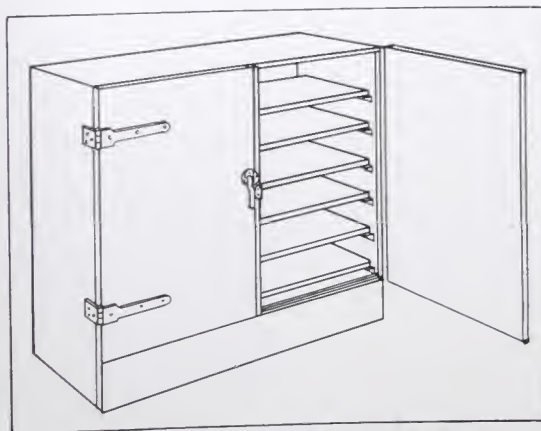
Desk with Slate Top and Sink

Cabinets of slate with slate doors such as are illustrated on this page provide excellent accommodations for the proper care of the specimens and instruments used in school laboratories. The slate does not warp or twist from dampness. It is non-staining and can be thoroughly washed and cleaned at intervals to form a clean, sanitary surface for the receipt of the material to be placed therein. These cabinets can be constructed of any size or arrangement.

They can also be furnished with glass over the tops to form an aquarium.

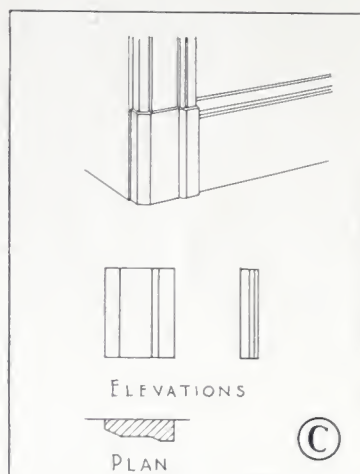
In Domestic Science Departments there are now being installed Laundry Tubs as a portion of the equipment required to carry out the curriculum. Tubs of natural slate have proven to be strong and serviceable and economical in upkeep. Standardized sizes and types are produced by the Structural Slate Company and are fully described and illustrated in Chapter 8.

It is suggested that Architects and School Officials get in touch with the Structural Slate Company, when they are about to consider the purchase of school equipment. The corps of experts in the service of the company, will be glad to make suggestions which may be of assistance in the designing of any portion of the equipment where the use of slate would be not only an advantage, but perhaps an economy in first cost and in future upkeep.



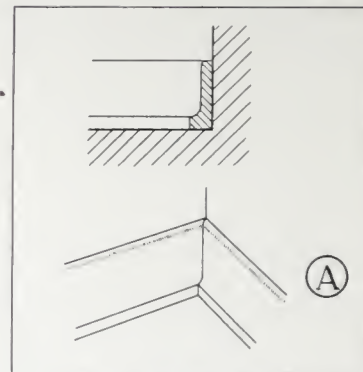
Cabinet of Slate, with Slate Doors and Shelves

BASES, WAINSCOTS, AND FLOORS



Detail of Slate Plinth

IN the selection of materials for the interior finish of School Buildings, there are certain portions, particularly the floors and walls of entrances, lobbies and corridors where the choice is limited to a material which will resist the hard usage usual to these locations. The floor should be of a material which can be washed and kept clean and sanitary. Floors of slate alone or of slate with tile inserts such as illustrated on this page or in combination with other materials form an effective and practical floor which is resistive to wear, is vermin proof and sanitary.

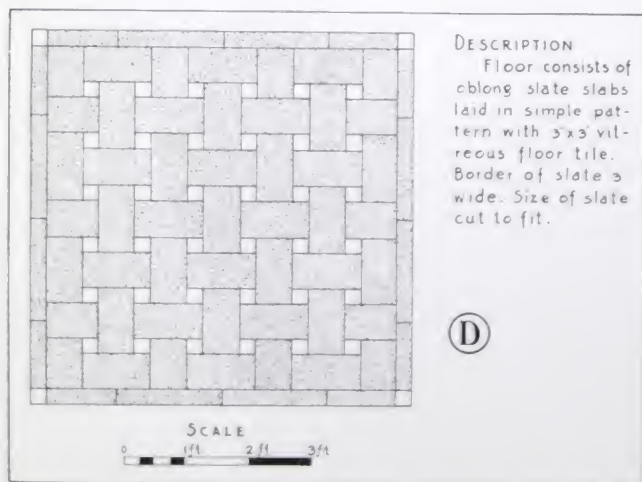


Detail of Slate Base

For the side walls of corridors, lobbies or vestibules the use of slate wainscoting is a protection to the walls in that it affords a strong, rigid, moisture- and stain-proof surface to take care of the natural rubbing against the walls by children of all ages and heights.

Details, descriptions and data concerning the use of slate in floors and wainscots is given in Chapter 9. This also describes and illustrates various types of slate bases which may be used at the bottom of side walls in connection with floors or walls of any material. In this position slate is particularly of value in that the floors may be washed or cleaned without damage to the side walls above the slate base.

Where slate or other similar material is used for the bases of side walls, the use of slate plinths under the trims of openings adds protection to the woodwork of the opening. The use of slate thresholds in openings, particularly where a floor of two different kinds occur on either side, forms an excellent means of joining the two. All of these uses of slate as well as numerous details of bases, caps, coves, etc., are shown in the Chapter above referred to.



Detail of Slate Floor



Slate Wainscot and Floor

ARCHITECTS WHO SPECIFY SLATE

IT is a tribute to the qualities and economies of Slate that its use everywhere by Architects and Constructors is constantly increasing.

The illustrations upon this page show two large school buildings designed by two school specialists in which natural slate blackboards are installed throughout. In addition there are the schools reproduced on page 20 by other well known architects.

In many large cities where the Board of Education has its own Architectural and Engineering Departments, blackboard slate is independently purchased while specifications for new or altered buildings call for slate to be used in the various other locations.

In addition to some of the architects who are officially connected with Boards of Education, and use nothing but natural slate for blackboards, there is a still larger list of those who have used Slate in School buildings erected under their supervision, either as blackboards or as stairs, wainscots, bases, etc. or for sanitary purposes. Among both of these, in addition to those whose work is illustrated, are:

C. B. J. Snyder, Architect and Superintendent of Buildings for the Board of Education, New York City.

John D. Cassell, Superintendent of Buildings for the Board of Education, Philadelphia, Pa.

Wm. R. MacCornack, Architect for the Board of Education, Cleveland, Ohio.

F. A. Naramore, Architect for Seattle Public Schools, Seattle, Wash.

R. M. Milligan, Commissioner of School Buildings, St. Louis, Mo.

A. F. Hussander, former Architect for the Board of Education, Chicago, Ill.

Edwin S. Gordon, Architect for the Board of Education, Rochester, New York.

Smith, Hinchman and Grylls, Detroit, Mich.

Kilham, Hopkins and Greeley, Boston, Mass.

Perkins, Fellows & Hamilton, Chicago, Ill.

Paul A. Davis, Philadelphia, Pa.

Ashby, Ashby & Schultze, Chicago, Ill.

Edward Stotz, Pittsburgh, Pa.

Boyd, Abel & Gugert, Philadelphia, Pa.

C. E. Schermerhorn & W. K. Philips, Philadelphia, Pa.

Theo. C. Kutzner, San Diego, Cal.

Gilbert R. Horton, Jamestown, N. D.

C. H. Johnston, St. Paul, Minn.

Irwin T. Catharine, Philadelphia, Pa.

H. Edward Walker, Minneapolis, Minn.

Wm. Gordon, St. Joseph, Mo.

Glen J. Pearcy, Manhattan, Kan.

Walter F. Fontaine, Woonsocket, R. I.

Ritter and Shay, Bethlehem, Penna.

Robert B. Upjohn, New York, N. Y.

Among the many school buildings in which structural slate in its various forms has been installed are:

Bethlehem High School, Bethlehem, Pa.

Porter School, Syracuse, New York.

Sterling High School, Sterling, Ill.

Ladoga School, Ladoga, Ind.

Brookline Grammar School, Brookline, Mass.

Sac City School, Sac City, Iowa.

Junior-Senior High School, Waukegan Rapids, N. C.

Castle School, Carlisle, Pa.

Groton High School, Groton, N. Y.

Massachusetts College of Pharmacy, Boston, Mass.

Ellendale Grade High School, Ellendale, N. D.

Radnor High School, Radnor, Pa.



Central High School, Washington, D. C. Wm. B. Ittner, Architect



Girls' High School, Brookline, Mass. Frank Irving Cooper, Architect.

SLATE BLACKBOARDS

THE constantly increasing use of slate blackboards in many schools is evidence of the thought and study given by architects to the installation of a material which best answers the purpose. The smooth, finely-finished surface which is given to the Pyramid Brand Blackboards of Natural Slate and the care taken in the inspection and workmanship before shipment is such that, when properly installed, perfect blackboards should result. Further data as to the production, finishing and installation of natural slate for blackboards is contained in a booklet issued by the Natural Slate Blackboard Company, which contains, in addition, detailed drawings showing installations based upon the experience of several architects who co-operated in the preparation of the drawings which are reproduced upon the opposite page.

SIZES AND THICKNESSES

Note—Wherever the word "width" is used it is to be taken as synonymous with "height."

Natural slate blackboards are produced and carried in stock in three standard widths, 3' 0", 3' 6" and 4' 0". These three widths comply with nearly all usual requirements in connection with blackboards for class rooms. The slate can, however, be cut to any desired width to suit special requirements or dimensions.

In lengths, the slate is cut to fit the dimensions of the spaces. The general practice followed, unless specific instructions are given, is to provide single slabs for spaces 4' 6" long; two slabs for spaces 4' 6" to 9' 0"; three slabs for spaces 9' 0" to 13' 6", etc. No slab should be less in length than its width, but in filling any desired space the slabs may vary in length by not to exceed one foot.

The thickness of the finished blackboard should not be more than $\frac{3}{8}$ " nor less than $\frac{1}{4}$ ". This allows the slabs to be properly set with a true, uniform, flush surface, including joints.



Milton High School, Milton, Mass.

LOCATIONS AND AREAS

For the convenience of designers of school buildings the booklet above referred to presents data taken from many sources giving the sizes and locations of blackboards as well as the heights of slabs and chalk troughs.

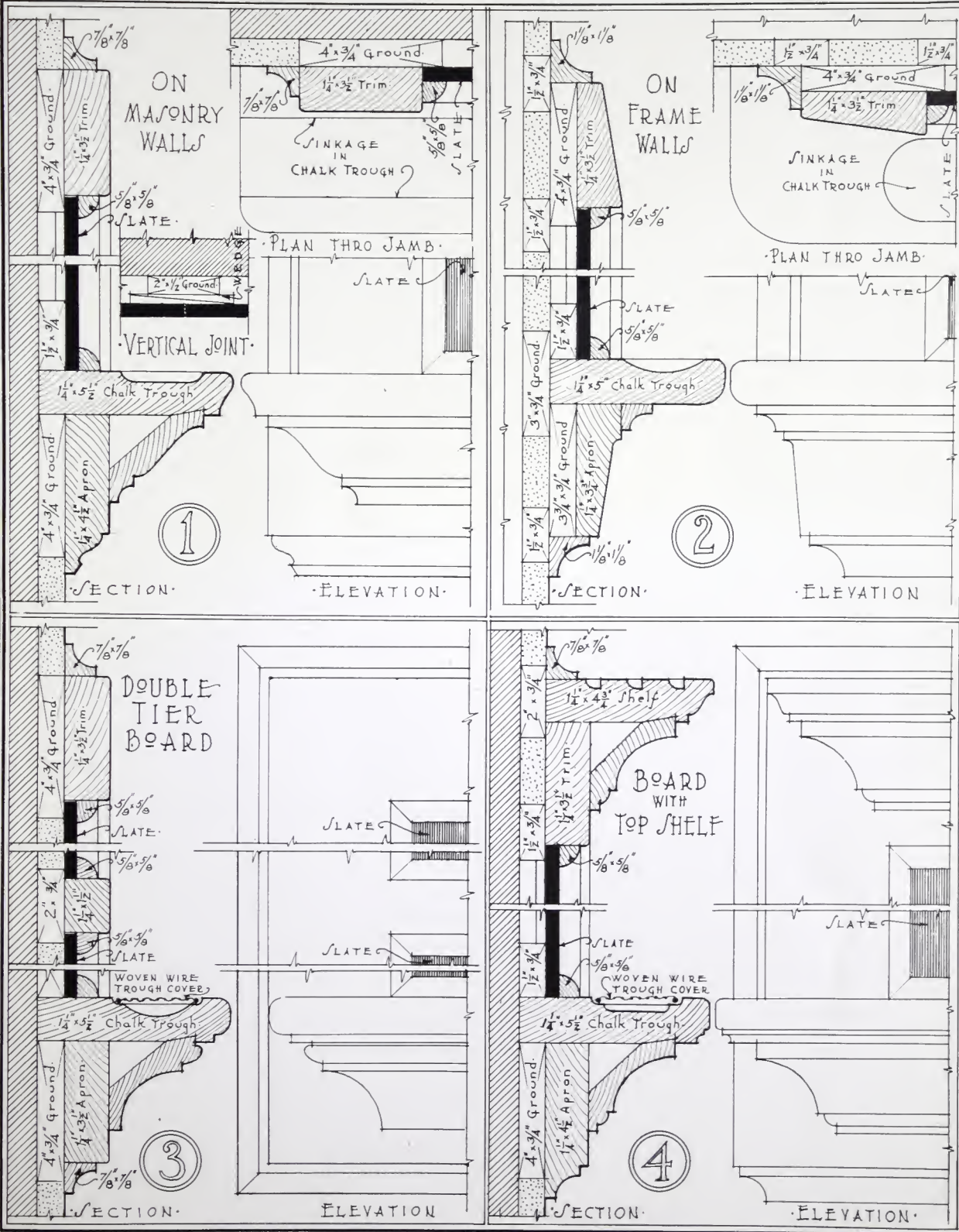
Standard heights of chalk rails and heights of blackboards as used in New York City and Boston are shown by the table printed below. In addition there is printed in the booklet on Natural Slate for Blackboards additional data which it is hoped will prove of value in connection with the use of slate blackboards. The illustration upon this page is of a blackboard of natural slate within a school building designed by Kilham, Hopkins and Greeley, Architects, Boston, Mass.

GRADE	HEIGHT OF CHALK TROUGH		HEIGHT OF BLACKBOARD		TOP OF BOARD ABOVE FLOOR	
	New York	Boston	New York	Boston	New York	Boston
Kindergarten	2' 0"	2' 2"	4' 0"	4' 0"	6' 0"	6' 2"
1st, 2d, 3d	2' 0"	2' 2"	4' 0"	4' 0"	6' 0"	6' 2"
4th	2' 6"	2' 4" 2' 6"	3' 6"	4' 0"	6' 0"	6' 4" 6' 6"
5th, 6th	2' 6"	2' 8"	3' 6"	4' 0"	6' 0"	6' 8"
7th	3' 0"	2' 8"	3' 6"	4' 0"	6' 0"	6' 8"
8th	3' 0"	2' 8"	3' 6"	4' 0"	6' 6"	6' 8"
High Schools	3' 0"	2' 8"	3' 6"	4' 0"	6' 6"	6' 8"

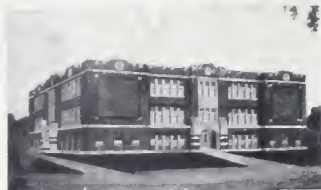
For Colleges it is usual to set the board 3' 0" above the floor and use a 4' 0" width.

FOUR TYPICAL DETAILS OF INSTALLATION

SCALE AS PRINTED 3 IN. = 1 FOOT.



SOME SCHOOLS IN WHICH SLATE HAS BEEN USED



*Clyde Public School, Clyde, Kan.
Lorentz Schmidt, Architect,
Wichita, Kan.*

WILL CONTINUE TO SPECIFY SLATE

"In all my school work I use Natural Slate Blackboards, and I am convinced that they are the most economical installation and that they give better satisfaction than any substitute on the market.

"I never consider a substitute for the Natural Slate where it is possible to use same."

LORENTZ SCHMIDT.

EVERLASTING QUALITY COMMENDS THEM

"It has been my invariable custom for the past twenty years to specify and have installed Natural Slate Blackboards in my school buildings. In that period I have completed schools to the value of several millions of dollars, and I have no instance where the Natural Slate boards have not given the greatest satisfaction. Their everlasting quality commends them to all my clients."

C. H. LLOYD.



*Steele School, Harrisburg, Penna.
Charles Howard Lloyd, Architect,
Harrisburg, Penna.*

SATISFACTION BASED ON EXPERIENCE

"Enclosed is a list of sixty-three school buildings, in all but three of which we used Natural Slate Blackboards.

"This is evidence that our experience with Natural Slate has been satisfactory."

WILSON POTTER.



*Gloversville High School,
Gloversville, N. Y.
Wilson Potter, Architect,
New York City*

NO SUBSTITUTE FOR NATURAL SLATE

"Natural Slate is the best for blackboards; no substitutes for me. I tried a substitute once, BUT NEVER AGAIN."

E. J. MOUNTSEPHEN.



*Stivers Manual Training School,
Dayton, Ohio
Edward J. Mountsephen, Architect,
Dayton, Ohio*

OPINIONS FROM SOME SCHOOL OFFICIALS

*J. H. Phillips, Superintendent of Public Schools,
Birmingham, Ala.*

"In a permanent building it is my judgment that only Natural Slate Blackboards should be used. All other kinds of blackboards, no matter what the method of their preparation, are temporary devices and, even though the best of their kind, must be considered poor substitutes for the Natural Slate."

*Clement C. Hyde, Principal Hartford Public High
School, Hartford, Connecticut*

"We have recently installed several hundred running feet of Natural Slate Blackboards in this building, substituting it for the old pulp board which had become unsatisfactory. Although the initial cost of Natural Slate is higher than some other boards, we have found from years of experience that it is the most satisfactory in the long run."

*H. L. Dorman, Superintendent of Public Build-
ings, Springfield, Massachusetts*

"The Natural Slate Blackboards furnished by your Company for several of our buildings in the past three years have been satisfactory, and all contracts with this department have been completed as agreed."

In addition to these three, numerous other letters are on record indicating satisfaction with the use of natural slate. Among them are letters from:

Emory E. Smiley, Superintendent of Schools, Durango, Colo.

W. F. Wenner, Superintendent Bartlesville Public Schools, Bartlesville, Oklahoma.

H. R. Edwards, Superintendent Crosby-Ironton Public Schools, Crosby, Minnesota.

C. L. Hill, Principal, Grantsburg, Wisconsin.

Edgar Reed, Superintendent of Public Schools, Centralia, Washington.

E. D. Price, Superintendent, Enid City Schools, Enid, Oklahoma.